

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.

ym



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/028,313	12/28/2001	Shunsuke Hirano	041-2082	4775

7590 11/03/2004

LOWE HAUPTMAN GILMAN & BERNER, LLP
Suite 310
1700 Diagonal Road
Alexandria, VA 22314

EXAMINER

CHO, UN C

ART UNIT PAPER NUMBER

2687

DATE MAILED: 11/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

ym

Office Action Summary

Application No.

10/028,313

Applicant(s)

HIRANO ET AL.

Examiner

Un C Cho

Art Unit

2687

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 August 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 09 September 2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on 9/9/2004 was filed after the mailing date of the Application #10/028,313 on 12/28/2001. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "frequency division unit for dividing the frequency of the signal outputted from the voltage control oscillator so as to output a second frequency-divided signal, said second frequency-divided signal having a divided frequency and a mixer unit for mixing the second frequency-divided signal outputted from the frequency division unit and the signal outputted from the voltage control oscillator so as to output a mixed signal" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet,

Art Unit: 2687

and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2, 4, 7, 9, 10, 12, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto et al. (US 6,006,078) in view of Lemay (US 6,321,074).

Regarding claim 1, Yamamoto discloses a voltage-controlled oscillator (VCO, Fig. 1, 103) having a terminal for oscillating a signal whose frequency corresponds to a control signal applied to the terminal, a first frequency divider (Programmable divider, Fig. 1, 104) for dividing the frequency of the signal outputted from the voltage-controlled oscillator so as to output a first frequency-

divided signal, said first frequency-divided signal having a divided frequency, a comparator (Phase comparator, Fig. 1, 101) for comparing a phase of the first frequency-divided signal with that of a reference signal so as to output a difference signal representing a difference between the phase of the first frequency divided signal and that of the reference signal, a loop filter (LPF, Fig. 1, 102) for smoothing the difference signal outputted from the comparator so as to output the smoothed signal as the control signal to the terminal of the voltage-controlled oscillator (Yamamoto, Col. 1, lines 24 – 50).

However, Yamamoto does not specifically disclose a frequency division unit for dividing the frequency of the signal outputted from the voltage control oscillator so as to output a second frequency-divided signal, said second frequency-divided signal having a divided frequency and a mixer unit for mixing the second frequency-divided signal outputted from the frequency division unit and the signal outputted from the voltage control oscillator so as to output a mixed signal. In an analogous art, Lemay discloses a frequency division unit (Fig. 2, 32) for dividing the frequency of the signal outputted from the voltage control oscillator so as to output a second frequency divided signal, said second frequency-divided signal having a divided frequency and a mixer unit (Fig. 2, 30) for mixing the second frequency-divided signal outputted from the frequency division unit and the signal outputted from the voltage control oscillator so as to output a mixed signal (Lemay, Col. 3, lines 36 – 67) thereby eliminating spurious responses and providing harmonic isolation. Therefore, it would have been

obvious to one of ordinary skill in the art at the time the invention was made to provide the technique of Lemay to the system of Yamamoto in order to eliminate spurious responses. Spurious responses in a transceiver can take place as a result of mixing between two or more external signals.

Regarding claim 2, Yamamoto in view of Lemay discloses a second frequency divider (Fig. 2, 32) for dividing the frequency of the signal outputted from the voltage control oscillator (Lemay, Col. 3, lines 43 – 52).

Regarding claim 4, Yamamoto in view of Lemay discloses a frequency divider (Fig. 2, 32) for dividing the frequency of the signal outputted from the voltage control oscillator (Fig. 2, 28) and another frequency divider (Fig. 2, 34) connected therewith in series, said frequency divider (Fig. 2, 34) adapted to divide an output signal outputted from the frequency divider (Fig. 2, 32) and said frequency divider (Fig. 2, 32) being served as the frequency division unit so as to supply the signal outputted from it to the mixer unit (Fig. 2, 30) (Lemay, Col. 3, lines 36 – 61).

Regarding claim 7, Yamamoto in view of Lemay discloses that the frequency division value M_i in the programmable divider (Fig. 1, 104) is changed by a program input from a controller in accordance with the frequency to be set when a reception frequency is changed so that the oscillating frequency of the VCO (Fig. 1, 103) can be arbitrarily changed by changing the frequency division value M_i (Yamamoto, Col. 1, lines 45 – 50).

Regarding claim 9, the claim is interpreted and rejected for the same reason as set forth in claim 1.

Regarding claim 10, the claim is interpreted and rejected for the same reason as set forth in claim 2.

Regarding claim 12, the claim is interpreted and rejected for the same reason as set forth in claim 4.

Regarding claim 15, the claim is interpreted and rejected for the same reason as set forth in claim 7.

Regarding claim 17, Yamamoto in view of Lemay discloses a mobile radio device (a radio receiver) having the frequency synthesizer (Yamamoto, Col. 1, lines 13 – 23 and Lemay, Col. 1, lines 24 – 39).

5. Claims 3, 8, 11 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto in view of Lemay as applied to claim 1 above, and further in view of Jokura (US 5,856,761).

Regarding claim 3, Yamamoto in view of Lemay discloses a second frequency divider (Fig. 2, 32) for dividing the frequency of the signal outputted from the voltage control oscillator (Lemay, Col. 3, lines 43 – 52).

However, Yamamoto in view of Lemay as applied to claim 1 above does not specifically disclose that the frequency divider divides on the basis of a frequency division ratio, said frequency divider being able to switch setting of the frequency division ratio. On the other hand, Jokura teaches switching the

frequency division ratio (Jokura, Col. 1, lines 56 – 58). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the technique of Jokura to the modified system of Yamamoto and Lemay to provide a PLL frequency synthesizer which is capable of high-speed channel switching without generating a high number of spurious signals in a large capacity communication system with small channel intervals using high reference frequency.

Regarding claim 8, Yamamoto in view of Lemay and further in view of Jokura discloses switching the frequency division ratio so as to set an average value from the switched frequency division ratios to a desired frequency division ratio (Jokura, Col. 1, lines 56 – 64).

Regarding claim 11, the claim is interpreted and rejected for the same reason as set forth in claim 3.

Regarding claim 16, the claim is interpreted and rejected for the same reason as set forth in claim 8.

6. Claims 5 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto in view of Lemay as applied to claim 1 above, and further in view of Tsukahara et al. (US 6,181,181).

Regarding claim 5, Yamamoto in view of Lemay as applied to claim 1 above discloses a mixer (Lemay, Fig. 2, 30).

However, Yamamoto in view of Lemay does not specifically disclose that the mixer unit has a first and a second phase shifter, a first and second mixer and an adder. In contrast, Tsukahara teaches a mixer circuit (Fig. 4, 211) comprising a first phase shifter (Fig. 4, 212) adapted to generate first and second signals, said first signal being shifted 90 degree away from the second signal; a second phase shifter (Fig. 4, 213) adapted to generate third and fourth signals, said third signal being shifted 90 degree away from the fourth signal; a first mixer (Fig. 4, 215) adapted to mix one of the first and second signals outputted from the first phase shifter and one of the third and fourth signals outputted from the second phase shifter; a second mixer (Fig. 4, 216) adapted to mix other of the first and second signals outputted from the first phase shifter and other of the third and fourth signals outputted from the second phase shifter; and an adder (Fig. 4, 217) adapted to add a mixed signal by the first and a mixed signal by the second mixer (Tsukahara, Col. 1, lines 55 through Col. 2, line 35). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the teaching of Tsukahara to the modified system of Yamamoto and Lemay to provide a phase shifter that obtains the two output signals in which the phase difference between the signals is substantially 90 degrees and has a small circuit area.

Regarding claim 16, the claim is interpreted and rejected for the same reason as set forth in claim 5.

Art Unit: 2687

7. Claims 6 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto in view of Lemay as applied to claim 1 above, and further in view of Yamagishi et al. (US 6,516,186).

Regarding claim 6, Yamamoto in view of Lemay as applied to claim 1 above discloses a mixer unit (Lemay, Fig. 2, 30).

However, Yamamoto in view of Lemay does not specifically disclose that the mixer unit is served to be able to switch as an upconvert mixer and a downconvert mixer according to a control signal from an outside. On the other hand, Yamagishi teaches that the frequency mixer (Fig. 10, 1 – 6) can be switched as an upconvert mixer and a downconvert mixer according to a local frequency signal from an outside (Yamagishi, Col. 1, lines 26 – 35). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the teaching of Yamagishi to the modified system of Yamamoto and Lemay to provide a new and improved image-rejection receiver, which can cancel an image signal completely.

Regarding claim 14, the claim is interpreted and rejected for the same reason as set forth in claim 6.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Tobise et al. (US 6,229,399) discloses a multiband PLL frequency synthesizer.

Damgaard et al. (US 6,526,265) discloses a transmitter for a wireless handset having a modified translation loop architecture.

Gillig (US 5,604,468) discloses a frequency synthesizer with temperature compensation and frequency multiplication.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Un C Cho whose telephone number is (703) 305-8725. The examiner can normally be reached on M ~ F 8:00AM to 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lester Kincaid can be reached on (703) 306-3016. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Un C Cho 10/25/04 *UC*
Examiner
Art Unit 2687

21C
10/29/04
LESTER G. KINCAID
PRIMARY EXAMINER